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APPLICATION FOR LETTERS PATENT FOR:

MOUNTING SYSTEM FOR MOUNTING A SUPPORT TO A RAIL OF A DECK

INVENTOR: **WARREN COHEN**

Attorney for Applicant
Eric A. LaMorte
Reg. No. 34,653
LaMorte & Associates, P.C.
P.O. BOX 434
Yardley, PA 19067
(215) 321-6772
mail@uspatlaw.com

MOUNTING SYSTEM FOR MOUNTING A SUPPORT TO A RAIL OF A DECK

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

In general, the present invention relates to mounting systems for mounting objects onto horizontal surfaces. More particularly, the present invention relates to mounting systems for mounting support poles to the top railing of a wooden outdoor deck.

2. PRIOR ART DESCRIPTION

Many modern homes have outdoor decks. Decks enable homeowners to have a comfortable area outside the confines of the home that is elevated off the ground and does not require landscaping. Many decks are built at the same level as one of the floors of the home. As such, to reach the deck, a homeowner need only open a door of the home to step out directly onto the deck. In good weather, a deck may serve as an extra room of the house, wherein a homeowner may pass many times between the deck and the interior of the house.

Since decks are so convenient in many homes, homeowners often store many outdoor items on their

decks to make the deck a functional part of the home. Such outdoor items commonly include outdoor furniture, barbeques, outdoor lamps, candles, electronic bug killers and the like. Accordingly, decks are also often decorated for aesthetics. As such, many decks contain wind chimes, flags, planters and other outdoor decorations.

Although many homeowners prefer their decks to be as open as possible, most local building codes require that all elevated decks contain railings. The railing prevents a person from accidentally stepping or falling off the deck. Although railings come in a variety of different styles and shapes, most railing configurations share common features. For example, most railings contain rigid posts that are firmly connected to the structure of the deck. Between these rigid posts are disposed horizontal spindles. Most commonly, two horizontal rails are used. Those horizontal rails typically include a base rail and a top rail. The horizontal rails are used to support vertical spindles. The base rail passes across the vertical spindles near the surface of the deck. The top rail passes across the tops of the vertical

spindles, thereby providing a continuous smooth railing around the entire rail structure.

Many commercial companies make specialty top rails for use around decks and along exterior stairways. Many of these top rails have unique cross sectional shapes. The different shapes provide homeowners with choices in how the overall railing of their deck appears.

As has been previously mentioned, people often place decorative objects on their decks. Many items, such as flags, wind chimes, lights, torches, bug killers and the like work best if placed in an isolated and elevated position. Furthermore, by placing such objects in elevated positions, such objects are kept out of the reach of any child that may be on the deck. Since decks typically are open, they do not have a ceiling or other high structures from which objects can be hung. The top rail is therefore often the highest part of the deck. However, for both safety and aesthetics, homeowners typically do not want to balance items like torches, bug killers and the like on the narrow top rail of a deck.

To solve this problem of object placement on a deck, many commercial items that are intended for use

on decks come with support posts that mount to the deck. Many such support posts terminate with some type of clamp that can be used to engage the spindle or top rail of the deck. Such, prior art support posts are exemplified by U.S. Patent No. 6,276,651 to Dolan, entitled Mounting Device For Flagpoles, and U.S. Patent No. 6,003,826, to Galloway entitled Supporting System For Patio Deck Accessories.

A problem associated with such prior art support posts is that the clamp used to attach the support post to the deck can only engage certain shaped deck elements. Most commonly, these elements must be either circular or rectangular in shape. However, as has been previously mentioned, decks with top rails that are unusually shaped are becoming increasingly common. If a prior art support post clamp is attached to a contoured top rail, the clamp would contact the top rail only at certain points. As the clamp is tightened, this concentrates the force of the clamp at the points of contact, which often causes crushing damage to the top rail. Alternatively, if the support post clamp is not tightened enough, the support post may remain loose and the object the support post holds

may fall over if the wind blows or if the support post is inadvertently touched.

A need therefore exists for an improved support post mounting system that can engage the top rail of a deck and make a strong non-damaging contact with the top rail even if the top rail has an unusually contoured shape. This need is met by the present invention as described and claimed below.

SUMMARY OF THE INVENTION

The present invention is a mounting system for mounting an object to the railing of a deck. The mounting system includes a base structure having a top side and a bottom side, wherein the base structure lay across the top of the deck rail. A support post extends upwardly from the base structure, so that the support post can support an object above the top rail of the deck. The base structure of the mounting system engages the top rail using two opposing elements that extend from the base structure down along the sides of the top rail. Each of the opposing elements defines a plurality of stepped surfaces that are generally parallel to the base structure. However, each of the stepped surfaces on the opposing elements are at

different distances from the bottom of the base structure. The stepped surfaces are positioned at points that correspond to common thicknesses of the lumber used in the construction of deck rails. In this manner, the contours of the opposing elements can engage different types of rails.

An adjustment mechanism is also provided for selectively adjusting the distance between the opposing elements. In this manner, the width of the mounting system can be adjusted to receive railings of different widths. Accordingly, a universal mounting system is provided that conforms to the shape of many different deck rails.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the present invention, reference is made to the following description of an exemplary embodiment thereof, considered in conjunction with the accompanying drawings, in which:

FIG. 1 is an exploded perspective view of an exemplary embodiment of the present invention mounting system;

FIG. 2 is a perspective view of the embodiment of FIG. 1 shown engaging a horizontal rail;

FIG. 3 is a cross-sectional view of the embodiment of Fig. 1;

FIG. 4 is a cross-sectional view of the embodiment of the mounting system of Fig. 1 shown engaging a plank of standard decking lumber;

FIG. 5 is a cross-sectional view of the embodiment of the mounting system of Fig. 1 shown engaging a full one inch thick plank;

FIG. 6 is a cross-sectional view of the embodiment of the mounting system of Fig. 1 shown engaging a framing stud; and

FIG. 7 is a cross-sectional view of the embodiment of the mounting system of Fig. 1 shown engaging a molded rail.

DETAILED DESCRIPTION OF THE DRAWINGS

Although the present invention mounting system can be used to attach any elongated support to most any piece of lumber, in any orientation, it is particularly well suited to attach a vertical support pole to a horizontal rail. Accordingly, by way of example, the present invention mounting system is described in an application where it is being used to mount a vertical support pole to the horizontal top rail of an outdoor deck. It will be understood that such an application is merely exemplary and is presented only to set forth one of the most common applications contemplated for the present invention.

Referring to Fig. 1, it can be seen that the mounting system 10 includes a base structure 12. The base structure 12 has a flat top surface 14. A support pole 16 is located in the center of the top surface 14 of the base structure 12. The support pole 16 extends at a perpendicular from the plane of the base structure 12. The support pole 16 and the base structure 12 can be welded together or otherwise manufactured as a unistructural construction.

Alternatively, the support pole 16 may engage the base structure 12 with a threaded connection or similar detachable mechanical interconnection.

The support pole 16 can be any length and may terminate at its top in many different configurations. The support pole can be used to hold a flag, plant, bug killer, wind chimes, torch or any other such object that is traditionally held in an elevated position.

The base structure 12 has side walls 18 that hook under the flat top surface 14. Accordingly, the side walls 18 of the base structure 12 and the underside of the top surface 14 combine to define an open track 20. Bolt holes 22 pass through the top surface 14 of the base structure 12 and into the track 20. The purpose of the bolt holes 22 is later described.

Two brackets 24 are provided that are used to clamp the base structure 12 onto a piece of lumber. Each of the brackets 24 is identical in form. Each of the brackets 24 contains a flat section 26. The flat sections 26 of the brackets 24 are sized to slide into the track 20 on the bottom of the base structure 12. Each flat section 26 is only half as thick as the track 20 is tall. In this manner, the flat sections 26

of both the brackets 24 can pass over one another in a lap joint while within the confines of the track 20. The track 20 on the underside of the base structure 12 engages the flat sections 26 of the brackets 24 and confines the movement of the brackets 24 to one direction in a single plane. Accordingly, the brackets 24 can only move towards and away from each other in the directions of arrows 27.

Slots 28 are formed in each of the flat sections 26 of the brackets 24. The slots 28 are formed in the center of the flat sections 26, wherein the slots 28 pass directly under the bolt holes 22 in the base structure 12. Accordingly, when the flat sections 26 of the brackets 24 are in the track 20 of the base structure 12, the bolt holes 22 and the slots 28 of both brackets 24 align.

Each of the brackets 24 also contains a contoured section 30 that extends from one end of the flat section 26. The contoured section 30 of the brackets 24 enables the brackets 24 to firmly engage lumber of different shapes and sizes, as will later be described.

Flat head bolts 23 extend upwardly through slots 28 in the flat sections 26 of the brackets 24. The

shanks of the flat head bolts 23 also extend through the bolt holes 22 in the base structure 12. The shank of the flat head bolts 23 are engages by threaded nuts 25. The threaded nuts 25 can be a regular hex-nut. However, wing nuts or knob nuts are preferred so that the threaded nut 25 can be tightened and loosened by hand.

When the threaded nut 25 is tightened on the shank of the flat head bolts 23, base structure 12 and the flat sections 26 of the brackets 24 are compressed between the threaded nut 25 and the head of the bolt 23. This locks the brackets 24 in place with the base structure 12.

Referring to Fig. 2, the full mounting system 10 is shown engaging a horizontal rail 33. To place the mounting system 10 on the horizontal rail 33, the brackets 24 are separated until the contoured sections 30 of each bracket 24 are far enough apart to pass around the sides of the horizontal rail 33. Once around the horizontal rail 33, the brackets 24 are moved toward one another until the contoured sections 30 of the brackets 24 abut against the sides of the horizontal rail 33. Once the contoured sections 30 of the brackets 24 are in abutment with the sides of the

horizontal rail 33, the threaded nuts 25 are tightened on the flat head bolts 23. This locks the base structure 12 to the brackets 24 at the set position. Accordingly, the brackets 24 become locked in place and cannot be moved until the threaded nuts 25 are loosened.

Referring to Fig. 3, it can be seen that the elements that are the contoured sections 30 of each of the brackets 24 contain a series of stepped surfaces 40, 42, 44, wherein each of the stepped surfaces 40, 42, 44 is a different distance from the base structure 12. The first stepped surface 40 is a first distance D1 from the bottom of the base structure 12. That first distance D1 is approximately three-quarters of an inch ± $1/16^{th}$ of an inch. The second stepped surface 42 is a second distance D2 from the bottom of the track 20. The second distance D2 is approximately one inch ± $1/16^{th}$ of an inch. The third stepped surface 44 is a third distance D3 from the bottom of the track. The third distance D3 is approximately one and a half inches ± 1/8th of an inch.

Between each of the stepped surfaces 40, 42, 44 is a bend. Accordingly, since three stepped surfaces 40, 42 and 44 are shown in the exemplary embodiment,

multiple bends are present in the contoured section 30 of each bracket 24 to create the different stepped surfaces 40, 42, 44.

Each of the stepped surfaces 40, 42, 44 is generally parallel to the base structure 12. That is, they are within a few degrees of being parallel. The contoured sections 30 of both the brackets 24 may be tilted inwardly a few degrees to provide the contoured sections 30 with a slight spring bias that presses the contoured sections 30 against the rail when the contoured sections 30 are pressed against the rail.

There are many types of lumber that carpenters and contractors use to create the top rail of a deck. Some of the most common types of lumber are decking lumber, such as 1" x 6" planks, framing lumber, such as 2" x 4" and 2" x 6" studs and molded rails. Referring to Fig. 4, a piece of standard, 1" x 6" decking lumber 50 is shown. The actual dimensions of standard 1 x 6 decking is ¾" x 5 ½". Such standard sized decking lumber 50 fits between the bottom of the base structure 12 and the first stepped surface 40 of the bracket 24. Accordingly, when the brackets 24 are moved against a piece of standard decking lumber 50, the first stepped surface 40 passes under the bottom

of the decking lumber 50. This fit prevents the support post 16 from being moved laterally and provides a strong mechanical engagement with the decking lumber 50.

Some decking is also made to be truly one inch thick. Such decking lumber is commonly known as full one inch decking lumber. Referring to Fig. 5, a piece of full one inch decking lumber 52 is shown. Such decking lumber 52 fits between the bottom of the base structure 12 and the second stepped surface 42 of the bracket 24. Accordingly, when the brackets 24 are moved against a piece of full one inch decking lumber 52, the second stepped surface 42 passes under the bottom of the decking lumber 52. This provides a strong mechanical engagement between the mounting device 10 and the decking lumber 52.

Referring to Fig. 6, a 2" x 4" framing stud 54 is shown. The real dimensions of standard 2" x 4" framing studs are 1 ¾" x 3 ½". Such standard sized framing studs 54 fit between the bottom of the base structure 12 and the third stepped surface 44 of the bracket 24. Accordingly, when the brackets 24 are moved against a standard framing stud 54, the third stepped surface 44

passes under the bottom of the framing stud 54. This provides a strong mechanical interconnection.

It will also be understood that framing studs also come in 2" x 6" and 2" x 8" dimensions. The mounting system 10 would engage such framing lumber in the same manner as shown in Fig. 6, except the brackets 24 would be spread farther apart to accommodate the wider lumber.

Some decking rails are also made from molded railing lumber. Such molded lumber typically has a curved top edge that prevents water from collecting in the top. Referring to Fig. 7, a piece of molded rail lumber 56 is shown. Such molded rail lumber 56 fits between the bottom of the base structure 12 and the first stepped surface 40 of the brackets 24. Accordingly, when the brackets 24 are moved against a piece of molded rail lumber 56, the first stepped surface 40 passes under the top edge of the lumber 56. Similarly, the second stepped surface 42 and the third stepped surface 44 of the bracket 24 may also engage parts of the molded rail lumber 56, depending upon its configuration.

It will be understood that horizontal rails do exist that are not illustrated within this

specification. Provided that such railings have a thickness or an indent at the ¾" mark, 1" mark and/or 1 ½" mark, the brackets 24 of the present invention mounting system 10 will engage the railing and prevent the mounting from detaching from the railing if a lateral force is experienced by the support pole. It will also be understood that the embodiments of the present invention mounting system that are described and illustrated herein are merely exemplary and a person skilled in the art can make many variations to the embodiment shown without departing from the scope of the present invention. For example, there are many sliding lap joint configurations that can be used to interconnect the base structure of the mounting system to the sliding brackets. Furthermore, there are many ways that sliding lap joints can be locked in place with screws. All such variations, modifications and alternate embodiments are intended to be included within the scope of the present invention as defined by the appended claims.